

REMARKS/ARGUMENTS

Response to Previous Amendments(s)/Argument(s)

The Office found the applicants' previous arguments dated April 20, 2007, for traversing rejections of claims 1-8 and 10-16, as not persuasive.

Regarding claims 1 and 3-10, the Examiner argues that the applicant's system is not operable "without using a RAID controller". The applicants disagree as fully described below in the section discussing 35 USC 112 rejections. Although the applicants disagree, they have amended the claims to reflect the examiner's interpretation of a "RAID controller".

The applicants' previous arguments relied on an inherency argument, but that argument is unnecessary in view of the current amendment to the claims.

Objection to the Application

The Examiner objected that claim 6 should recite "without a RAID controller" instead of "without a RAID controller". The applicants agree, and have amended claim 6 accordingly.

35 USC 112

The Office objected to claims 1, 5, 6, and 11 as having insufficient written description support in the Specification, specifically a failure to teach an array being usable as a RAID system without the use or inclusion of anything that can be consider a RAID controller. The applicants understand the Examiner's arguments, however, they respectfully disagree.

In prior art RAID systems, a "RAID controller" is a dedicated module that manages the RAID system. The applicants' system lacks such a common, dedicated module. Instead, the applicants have devised a system where the RAID array is disaggregated across multicast storage areas and is accessible by independent clients without requiring a common RAID controller. Each independent client can include RAID functionality to access data stored on the storage areas, but lacks a RAID controller *per se*.

The applicants have appreciated that one or more common, central controllers are simply unnecessary to implement multicast RAID capabilities across storage areas that are accessible by independent clients. In fact, by providing multicast RAID functionality to each independent client, controller bottlenecks are eliminated and read/write performance of the over all system is increased. With the applicant's contemplated approach, many clients are now able to access a RAID system without encountering controller induced latencies.

Using the applicants' approach, each storage device is greatly simplified because each storage area on the storage devices responds to simple read/write block requests and operates as a peer to the independent clients on the network. Such an approach eliminates complex software/firmware operations using specialized hardware in the storage device thereby reducing the overall cost of the RAID system.

Although the applicants disagree with the Examiner's arguments, the applicants have amended the claims herein according to the Examiner's interpretation of a RAID controller to further the application through prosecution. The Examiner's interpretation of a RAID controller includes "any managing or controlling element (controller) that is involved with a redundant array of inexpensive/independent disks (RAID)". More specifically, the claims now focus on independent clients having independent RAID controllers accessing a multicast RAID system.

Claim 1 is amended to recite that an array of multicast storage areas is "accessible by a first client having a first RAID controller and accessible by a second client having a second RAID controller distinct from the first RAID controller". This amendment and the following amendments bring the claims into alignment with the Examiner's interpretation that "the computer or host is controller the RAID, and can be seen as a RAID controller".

Claim 5 is amended to recite that a first and a second device "do not require a common RAID controller to store data on the plurality of storage devices" where the plurality of storage devices form the array.

Claim 6 is amended to recite that the multicast devices are operable "with a plurality of clients each having an independent RAID controller".

Claim 11 is amended to recite that a dynamic mirror is “accessible by a first client having a first RAID controller and accessible by a second client having a second RAID controller distinct from the first RAID controller.”

The Applicant’s approach is fully enabled in the pending application. Additional enablement, however, can be found in U.S. Patent Application Number US20040213226, which is incorporated by reference in its entirety. In that application, a pool of devices form a multicast RAID group aggregated at the point of the client. Each client accesses the same group without going through a common, intervening RAID controller (see paragraph [160] of US20040213226 and Figure 35, elements 3521 and 3522, also note that Figure 36 and 37 further illustrate this).

Additional details regarding the amended claims can be found below in the discussion regarding 35 USC 102 and 103 rejections.

35 USC 102

The Office rejected claims 1, 3-8, 10 and 11 as being anticipated by Wang et al. (US Patent 6,834,326). The applicants respectfully disagree especially in view of the amendments herein.

Claim 1 is amended to recite that an array of multicast storage areas is “accessible by a first client having a first RAID controller and accessible by a second client having a second RAID controller distinct from the first RAID controller.” Wang does not do that. In fact, Wang teaches that clients access the storage array through a common RAID controller.

To further illustrate this issue, Wang references an intelligent switch operating as a RAID controller (see C2/L26-32). Additionally, in column 8, lines 31 through 45, Wang indicates that “the switch may be a server” to provide access to the data stored on the RAID array. Clients naturally access data through the server which, according to the Examiner’s interpretation, operates as a common RAID controller. Figure 5 also indicates that the RAID array exists behind one or more RAID controllers in a manner that shows all clients must access the RAID group through the same controller bottlenecks. In all cases there is a common RAID controller through which clients must access data. The clients contemplated by Wang do not have independent RAID controllers as recited by Claim 1.

Claims 3 and 4 are now allowable by virtue of their dependency on claim 1.

In a similar vein, Claim 5 is amended to recite that a first and a second device “do not require a common RAID controller to store data on the plurality of storage devices” where the plurality of storage devices form the array. Again, Wang does not do this but rather teaches that multiple devices access data using common RAID controllers.

Claim 6 is amended to recite that the multicast devices are operable “with a plurality of clients each having an independent RAID controller”. Again, Wang teaches that the RAID controllers are common to clients as opposed to each client having an independent RAID controller.

Claims 7, 8, and 10 are now allowable by virtue of their dependency on claim 6.

Claim 11 is also amended, and recites that a dynamic mirror is “accessible by a first client having a first RAID controller and accessible by a second client having a second RAID controller distinct from the first RAID controller”. Yet again, Wang teaches that the RAID controllers are common to clients as opposed to clients having independent RAID controllers.

35 USC 103

The Office rejected claim 2 as being obvious over Wang (US Patent 6,834,326) in view of Kim (Internet Multicast Provisioning Issues for Hierarchical Architecture). The applicants respectfully disagree especially in view of the amendments herein.

Claim 2 is now allowable by virtue of its dependency on claim 1 which includes the limitation that an array of multicast storage areas is “accessible by a first client having a first RAID controller and accessible by a second client having a second RAID controller distinct from the first RAID controller.” Both Kim and Wang, alone or combined, fail to teach, suggest, or motivate the feature recited by claim 1.

The Office rejected claims 12-16 as being obvious over Wang (US Patent 6,834,326) in view of Lin et al. (“RMPT: A Reliable Multicast Transport Protocol). The applicants respectfully disagree especially in view of the amendments here.

Claims 12-16 depend directly or indirectly on in depended claim 11 and by virtue of their dependency include claim 11's limitation of a dynamic mirror that is "accessible by a first client having a first RAID controller and accessible by a second client having a second RAID controller distinct from the first RAID controller". Lin adds nothing to the concepts presented by Wang to motivate such a feature.

Claims 12-16 are now allowable by virtue of their dependency on claim 11.

Request For Allowance

Claims 1-8 and 10-16 are pending in this application. The applicants request continued examination and allowance of all pending claims.

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